



PhD position in Modeling and Optimal Design of Marine Hybrid Electric Power Systems for SFI Smart Maritime WP3.2(IV-82/19)

About the position

We have a vacancy for a PhD at Department of Marine Technology in Modeling and Optimal Design of Marine Hybrid Electric Power Systems.

In conjunction to activities associated with Norwegian Centre for improved energy efficiency and reduced harmful emission (SFI Smart Maritime), a number of doctoral and postdoctoral positions are opened at the Department of Marine Technology at Norwegian University of Science and Technology (NTNU) in 2019. The considered positions are related to several work packages (WPs) defined within the SFI Centre, namely WP2: Hull and propeller optimization, WP3: Power systems and fuels, and WP4: Ship system integration and validation. The work should be performed both within and across the specified WPs and in close cooperation with the researchers from SINTEF Ocean, and also involving industry partners of the Centre.

The main goal of the SFI Smart Maritime is oriented towards the greening of the maritime transport by developing new knowledge, methods and technologies as well as educating new professionals for maritime sector, thus enabling the Norwegian maritime cluster to be world leading in environmentally friendly shipping in the nearest future. Achieving all this requires both innovative use, improvement and combination of technologies that are not only energy and emission efficient, but also cost effective, enabling additional increase of the revenues for the maritime industry.

Reports to the supervising professor.

Job description

- PhD position in Modeling and Optimal Design of Marine Hybrid Electric Power Systems
- The proposed research topic is related to modeling and optimal design of hybrid power systems aiming to minimize the fuel consumption and corresponding emissions from ship propulsion as well as reduction of both capital and operational costs.
- The variety of considered solutions is not limited only by ones applicable for new-build hybrid vessels, but also includes stand-alone retrofit solutions available for existing ships.
- The design of the hybrid power system will be obtained through multi-objective optimization based on laboratory experiments and operational data from existing marine vessels.
- In this framework, different combinations of energy sources and energy storage systems (ESS), such as gensets, battery, fuel cell, and supercapacitor, will be considered to cover the different propulsion system arrangements for hybrid-powered ships.
- The research work will be performed as a combination of theoretical modeling along with the laboratory experiments in the Hybrid Power Lab and analysis of real on-board performance data.
- The PhD work will be carried out in an interdisciplinary research environment and in strong collaboration with other researchers both within SFI Smart Maritime and NTNU, and outside, i.e. including our industry partners and international collaborators, namely Department of Energy Technology at Aalborg University.

Qualification requirements

The PhD-position's main objective is to qualify for work in research positions. The qualification requirement is completion of a master's degree or second degree (equivalent to 120 credits) with a strong academic background in Electrical engineering, Marine Technology, Control/Engineering cybernetics, Mechanical Engineering, Computer Engineering/Computer Science, or a similar relevant area, or equivalent education with a grade of B or better in terms of [NTNU's grading scale](#). Applicants with no letter grades from previous studies must have an equally good academic foundation. Applicants who are unable to meet these criteria may be considered only if they can document that they are particularly suitable candidates for education leading to a PhD degree.

The appointment is to be made in accordance with the regulations in force concerning State Employees and Civil Servants and [national guidelines for appointment as PhD, postdoctor and research assistant](#).

Other qualifications:

- Knowledge and experience in one or more of the following subjects may be an advantage: modeling of power systems, power electronics, optimization, intelligent systems, data mining and machine learning.
- Good written and oral English language skills. Applicants from non-English speak countries outside Europe must present an official language test report. The acceptable tests are TOEFL, IELTS, and Cambridge Certificate in Advanced English (CAE) or Cambridge Certificate of Proficiency in English (CPE). Minimum scores are:
 - TOEFL: 600 (paper-based test), 92 (Internet-based test)

- o IELTS: 6.5, with no section lower than 5.5 (only Academic IELTS test accepted)
- o CAE/CPE: grade B or A

Personal characteristics

- Ability and motivation to work as part of a cross-disciplinary research team. The candidate is expected to expand his/her knowledge in other fields as a part of the PhD project.
- Motivation for the laboratory work and practical implementation of the developed methods.
- Strong analytical skills
- Good communication skills, both oral and written
- Positive attitude and interested in teamwork

In the evaluation of which candidate is best qualified, emphasis will be placed on education, experience and personal suitability, as well as motivation, in terms of the qualification requirements specified in the advertisement.

We offer

- exciting and stimulating tasks in a strong international academic environment
- an open and [inclusive work environment](#) with dedicated colleagues
- favourable terms in the [Norwegian Public Service Pension Fund](#)
- [employee benefits](#)

Salary and conditions

PhD candidates are remunerated in code 1017, and are normally remunerated at gross from NOK 449 400 before tax per year. From the salary, 2 % is deducted as a contribution to the Norwegian Public Service Pension Fund.

The period of employment is 3 years without teaching duties required. Appointment to a PhD position requires admission to the PhD programme in Engineering (<https://www.ntnu.edu/studies/phiv>).

As a PhD candidate, you undertake to participate in an organized PhD programme during the employment period. A condition of appointment is that you are in fact qualified for admission to the PhD programme within three months.

General information

[Working at NTNU](#)

A good work environment is characterized by diversity. We encourage qualified candidates to apply, regardless of their gender, functional capacity or cultural background. Under the Freedom of Information Act (offentleglova), information about the applicant may be made public even if the applicant has requested not to have their name entered on the list of applicants.

Questions about the position can be directed to Ass. Prof. Mehdi Zadeh, mehdi.zadeh@ntnu.no

About the application:

Publications and other academic works that the applicant would like to be considered in the evaluation must accompany the application. Joint works will be considered. If it is difficult to identify the individual applicant's contribution to joint works, the applicant must include a brief description of his or her contribution.

Please submit your application electronically via jobb norge.no with your CV, diplomas and certificates. Applicants invited for interview must include certified copies of transcripts and reference letters. Please refer to the application number **IV-82/19** when applying.

Please note that we have a number of positions associated to SFI Smart Maritime in 2019. Within this application, please specify the fellowship number by indicating **WP3.2**. If you plan to apply to more than one position, we kindly ask you to submit a full application to each position.

Application deadline: 01.03.19

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The Norwegian University of Science and Technology (NTNU) creates knowledge for a better world and solutions that can change everyday life.

Department of Marine Technology

We develop methods and technology related to the blue economy: oil and gas extraction at sea, ship technology and the equipment industry, fisheries and aquaculture. We also have a strong commitment to the development of sustainable solutions for offshore renewable energy, coastal infrastructure, and marine robotics. Marine technology helps to solve major global challenges related to the environment, climate, energy, food and efficient transport. [The Department of Marine Technology](#) is one of eight departments in [the Faculty of Engineering](#).

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